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Investigation of mechanical properties of thermal coatings obtained during plasma spraying of powder zirconium dioxide

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Abstract

© Published under licence by IOP Publishing Ltd. Thermal coatings of zirconia partially stabilized with yttrium, deposited by low-temperature plasma, are the basis for the thermal protection of aircraft engine. At the same time there is an actual problem of selection of coating systems "ceramic layer - underlayer" of great thickness, providing better thermal protection, but having low strength characteristics due to the accumulation of internal stresses. To determine the optimal thickness of the test method used in the 4-point bending to allow the surface coating to explore in the elastic-plastic behavior of the field of coatings and strength. Based on the experimental results established the role of underlayer in the formation of the complex mechanical properties of thermal barrier coatings. With a well formed underlayer (PVNH16U6) system becomes sensitive to a change in thickness of the coating, to optimize the response on the strength and deformation criteria. According to the results the optimum ratio of the thickness of the ceramic layer and the underlayer should be regarded as the ratio of 3-5 for which the highest strength values were obtained for all the test coating systems.

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